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# INSECT, DISEASE, AND ANIMAL DAMAGE SURVEY OF BLACK WALNUT EVALUATION PLANTATIONS, WAYNE-HOOSIER NATIONAL FOREST, 1977

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## INTRODUCTION

The Eastern Region of the U. S. Forest Service is conducting a tree improvement program as a means of bettering the quality and growth rate of black walnut on National Forest land. An important part of this program is the establishment of tree evaluation plantations. Seedlings grown from nuts collected from superior trees at various locations are planted to determine the product of genetic-environmental interaction in a particular area.

In June 1977, we surveyed two black walnut tree evaluation plantations on the Wayne-Hoosier National Forest (one each in Ohio and Indiana). This is the fourth and last in a series of four reports on tree evaluation plantations. The first three reports were on black cherry, yellow birch, and tulip poplar.

## OBJECTIVE

This survey was made to determine the incidence of insects, diseases, and animal damage on two of the black walnut tree evaluation plantations on the Wayne-Hoosier National Forest.

## METHODS

Half of the seedlings were examined in each plantation to determine which insects, diseases, and animal damage were present. The most common conditions were photographed for this report. Questionable samples were collected and returned to the laboratory for more scrutinous examination or culturing.

## RESULTS AND DISCUSSION

Table 1 shows the number of trees examined, the number present, and the percent present in each plantation. Table 2 shows percent trees affected by various insects and diseases and damaging agents. The only damage of any concern was caused by climatic factors such as frost. Loss of growth and form resulted.

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## Terminal Bud Failure

Failure of the terminal bud to break dormancy caused a moderate amount of damage at the Stinking Fork plantation and no damage at the Covered Bridge plantation. The exact cause of this terminal bud failure and assumption of apical dominance by a lateral bud is unknown. We suspect that the bud was damaged by subzero temperatures.

## Terminal Dieback

Eighty-four percent of the trees at the Stinking Fork plantation and 18 percent of the trees at the Covered Bridge had a dieback of the terminal shoot. The exact cause of the dieback is unknown. Perhaps the same climatic factors that caused the terminal bud failure are responsible for the dieback. About 10 percent of the damaged shoots had a small insect-made hole at the transition zone between living and dead tissue. Almost all of the shoots had been invaded by Melanconis juglandis (E&E) Graves. This fungus is reported to be a weak pathogen only attacking shoots weakened by other factors. We did notice that the fungus appeared to enter the insect damage and cause the shoot death.

## Frost

The Covered Bridge plantation had foliage with frost damage on 70 percent of the trees. In all cases, the trees had broken dormancy and developed about two inches of new growth which had died from frost. The damaged foliage turned black and drooped, leaving a 3 to 4 inch dead tip on each affected shoot. Seven percent of the trees in the same plantation had frost killed foliage but no shoot damage.

## Leaf Feeders

About three-fourths of Ohio trees showed slight damage from a variety of defoliating insects (e.g., Maybeetles, caterpillars, and leafbeetles). Despite widespread incidence, injury was negligible and of little consequence.

## Mites

Damage by mites was noticeable in both states. In the early spring, juices are sucked from tender, developing walnut leaflets. These leaflets are permanently stunted, and later in the growing season, they contrast sharply with normal-sized unattacked leaflets (Figure 4). None of the attacked trees were seriously injured.

Walnut Curculio

A weevil, Contrachelus retenus Say, was found attacking 5 percent of the trees in Indiana. This beetle most often bores into shoots near the leaf petiole (Figure 5). Occasionally, this causes shoots to break off or die back to the attack point. Impact at the Stinking Creek plantation was minor.

Treehopper Oviposition Damage

About one in five trees in the Ohio Covered Bridge plantation showed treehopper (probably Enchenopa binotata) oviposition damage in branches and twigs. Attacked trees show a series of minute, crescent-shaped or straight niches on the outer bark. In other tree species, these niches have been shown to be entry sites for disease-causing fungi, but no such association was apparent here. Impact was negligible.

Walnut Lacebug

Feeding by this bug, Corythucha juglandis (Fitch) caused minor damage to about 6 percent of the sampled trees in Ohio. Leaves on affected trees were blackened and slightly perforated (Figure 7).

Mechanical Damage

Mechanical damage was low at both plantations. The damage could have occurred during planting, by plantation management activities (e.g., mowing) or from climatic factors. We could not determine the specific causes of mechanical damage at either plantation.

Animal Damage

A few trees in Indiana were browsed by rabbits and girdled by mice. Overall impact was very minor.

Table 1. Black walnut survival - tree evaluation plantations, Wayne-Hoosier National Forest, 1977 (50% survey)

| | Stinking Fork (Indiana) | Covered Bridge (Ohio) |
|---|---|---|
| Sites examined | 534 | 500 |
| Trees present | 457 | 465 |
| Percent trees present | 85 | 93 |

Table 2. Percent trees affected by damage agents on black walnut progeny test areas

| Damage Agents | Stinking Fork (Indiana) | Covered Bridge (Ohio) |
|---|---|---|
| Terminal bud failure | 17 | 1 |
| Terminal dieback | 77 | 17 |
| Terminal dieback with insect hole | 7 | 1 |
| Frost (dieback) | 0 | 70 |
| Frost (no-dieback) | 0 | 7 |
| Leaf feeding | 71 | 1 |
| Mites | 8 | 1 |
| Walnut curculio | 5 | 0 |
| Treehopper oviposition | 2 | 19 |
| Lace bug | 0 | 6 |
| Mechanical | 8 | 6 |
| Animal | 2 | 0 |

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SELECTED REFERENCES

The following references outline signs and symptoms of insects and diseases attacking' black walnut:

Baker, Whiteford L. 1972. Eastern forest insects. USDA Misc. Pub. No. 1175, 642 p.

Hepting, G. H. 1971. Diseases of forests and shade trees of the United States. USDA For. Serv. Ag. Hnd. 385.

Johnson, Warren T. and Howard L. Lyon. 1976. Insects that feed on trees and shrubs. Comstock Publishing Company, Ithaca, N. Y.

Figure 1. Terminal bud failure

Figure Dieback of walnut shoots. Black specks are fruiting bodies of Melanconis juglandis

Figure 3. Walnut shoot damaged by frost

Figure 4. Mite damage to leaflets

Figure 5. Damage to shoot caused by walnut curculio, Contrachelw retentus

Figure 6. Treehopper oviposition slits, probably caused by two-marked :.reehopper, Enchenopa binotata

Figure 7. Black stippling on leaflets caused by walnut lacebug, Corythucha juglandis